NASA Facts

National Aeronautics and
Space Administration

John F. Kennedy Space Center
Kennedy Space Center, Florida 32899
AC 321 867-2468

July 2001
KSC Release No.73-01

STS-104/Atlantis

Joint Airlock Module, International Space Station's Doorway To Space

The 6 ½ ton U.S.-made Joint Airlock Module will be delivered to the International Space Station (ISS) by the Space Shuttle Mission STS-104 crew. The arrival of the module on this 10th flight to the Space Station will enable astronauts to perform spacewalks without the presence of a Space Shuttle.

During this scheduled 11-day mission, the crew of Atlantis will connect the airlock to the starboard side of Node 1, Unity. Both Shuttle and Station robotic arms will be used to attach the Joint Airlock Module, which is actually made up of two separate chambers.

The **Equipment Lock** component is used for storing gear, and it is equipped for one or two astronauts to sleep the night before a planned spacewalk. The Equipment Lock will house space suits, batteries, power tools and other supplies necessary for Station external assembly work.

The **Crew Lock** is the pathway astronauts will use to exit and enter the ISS for spacewalks. The Crew Lock's design was derived from the Space Shuttle external airlock. It has lighting, handrails and an Umbilical Interface Assembly. This Assembly will provide spacewalkers with water, wastewater return, oxygen, communication capabilities and spacesuit power. The third and final spacewalk of the flight will be the inaugural excursion out of the newly activated Airlock.

Four pressurized gaseous oxygen and gaseous nitrogen storage tanks vital to the operation of the Joint Airlock will also be carried to the Station on a Spacelab Logistics Double Pallet in the orbiter's payload bay. The STS-104 crew will install the tanks around the perimeter of the Joint Airlock on the ISS during the course of three spacewalks. The tanks will support future Station spacewalk operations and experiments and augment the ISS Service Module resupply system.

This mission signals the completion of the second phase of the Space Station assembly. With the addition of the Airlock, the ISS will have about 15,000 cubic feet of habitable volume, more room than a conventional three-bedroom house.

The Crew

Commander **Steven W. Lindsey** will lead the five-member crew of STS-104 on his third flight. He served as pilot on STS-87 in 1997 and STS-95 in 1998 and has logged over 589 hours in space. Lindsey received a Bachelor of Science degree in engineering sciences from the U.S. Air Force Academy in 1982 and a master's degree in aeronautical engineering from the Air Force Institute of Technology in 1990. In 1983, he was recognized as a distinguished graduate of Air Force Undergraduate Pilot Training. Lindsey also is a distinguished graduate and recipient of the Liethen-Tittle Award as the outstanding test pilot of the USAF Test Pilot School Class 89A. He was born in Arcadia, Calif., but considers Temple City, Calif., to be his hometown. Lindsey and his wife, the former Diane Renee Trujillo, have three children.

He has served as a combat-ready pilot, instructor

pilot and academic instructor at Bergstrom. Lindsey also was the deputy director of the Advanced Tactical Air Reconnaissance System Joint Test Force and was the squadron's F-16 Flight Commander for the 3247th Test Squadron. He has logged over 3,800 hours of flying time in 50 types of aircraft.

Since becoming an astronaut in 1996, Lindsey worked in the Shuttle Avionics Integration Laboratory (SAIL) in flight software verification and as the Astronaut Office representative working on the Multifunction Electronic Display System (MEDS) program. He also served as Deputy for Shuttle Operations and Co-Chairman of the Space Shuttle Cockpit Council, which is responsible for designing and implementing an advanced Shuttle cockpit.

Charles O. Hobaugh will serve as pilot on his first space flight. In 1984, he graduated from the Marine Corps Basic School and received a Bachelor of Science degree in Aerospace Engineering from the U.S. Naval Academy. Houbaugh served as a Squadron Weapons and Tactics Instructor. He also served as an AV-8 Project Officer and as the ASTOVL/JAST/JSF Program Officer. Houbaugh has logged over 3,000 flight hours in more than 40 different aircraft and has over 200 V/STOL shipboard landings.

Since becoming an astronaut in 1996, he worked in the Operations Branch in the Astronaut Office Spacecraft Systems at Johnson Space Center. He was born in Bar Harbor, Maine. Hobaugh and his wife, the former Corinna Lynn Leamen, have four children.

Mission Specialist **Michael L. Gernhardt** (Ph.D.) will make his fourth space flight aboard STS-104. During the mission, he will perform three spacewalks related to the assembly of the Space Station. He was selected as an astronaut by NASA in 1992. Dr. Gernhardt worked in flight software verification for SAIL, contributed in the development of nitrox diving to support training for the Hubble Space Telescope repair, Shuttle prelaunch vehicle checkout and as CAPCOM—Mission Control Center's spacecraft communicator. His previous space flights as a mission specialist include STS-69, STS-83 and STS-94. Dr. Gernhardt has logged over 931 hours in space, including 6 hours and 46 minutes of spacewalks.

In 1978, he received a Bachelor of Science degree in physics from Vanderbilt University. Dr. Gernhardt received a Master of Science degree in 1983 and a doctorate in bioengineering in 1991 from the University of Pennsylvania. While attending graduate school, he developed a new theoretical decompression model based on tissue gas bubble dynamics. Prior to becoming an astronaut, he worked as a professional deep sea diver and a project engineer on worldwide subsea oil field construction and repair projects. He also served as Manager and Vice President of Special Projects for Oceneering International. Dr. Gernhardt was born in Mansfield, Ohio. He is currently leading an international effort to develop new prebreathe procedures for future spacewalks from an International Space Station.

Mission Specialist **James F. Reilly II** (Ph.D.) will make his second space flight aboard Atlantis. His first space flight was STS-89, the eighth Shuttle-Mir docking mission. Dr. Reilly will perform three spacewalks during mission STS-104. He was born at Mountain Air Force Base, Idaho, but considers Mesquite, Texas his hometown. He received a Bachelor of Science degree in geosciences in 1977, a Master of Science degree in 1987, and a doctorate in geosciences in 1995 from the University of Texas-Dallas. While in graduate school, Dr. Reilly was selected to participate as a research scientist specializing in stable isotope geochronology as part of a scientific expedition to West Antarctica. He also worked for an oil and gas exploration geologist for Enserch Exploration, Inc., eventually becoming the Chief Geologist of the Offshore Region.

Dr. Reilly worked for the Astronaut Office Computer Support Branch. He has logged over 211 hours in space. Dr. Reilly and his wife, the former Jo Ann Strange, have three children.

Mission Specialist **Janet Lynn Kavandi** (Ph.D.) will make her third space flight on Mission STS-104. She was selected as an astronaut in 1994 and worked at Johnson Space Center supporting payload integration for the International Space Station. Dr. Kavandi received a Bachelor of Science degree in chemistry from Missouri Southern State College-Joplin in 1980, a Master of Science degree in chemistry from the University of Missouri-Rolla in 1982, and a doctorate in analytical chemistry from the University of Washington-Seattle in 1990. Her doctoral dissertation, which focused on pressure-indicating coating resulted in two patents. Dr. Kavandi was an engineer at the Boeing Aerospace Company in the Power Systems Technology Department for ten years. While with Boeing, she served as the lead engineer in the design and development of thermal batteries for Sea Lance and the Lightweight Exo-Atmospheric Projectile. She was a mission specialist on STS-99, the Shuttle Radar Topography mission.

She supported payload integration for the ISS while working for the Payloads and Habitability Branch. Dr. Kavandi has logged over 503 hours in space. She was born in Springfield, Mo. Dr. Kavandi and her husband, John, have two children.

Related NASA Web sites

Mission and crew press kit:
www.shuttlepresskit.com/

Mission and crew:
spaceflight.nasa.gov/

Shuttle countdown - Kennedy Space Center:
www-pao.ksc.nasa.gov/kscpao/shuttle/countdown/

Multimedia prelaunch guest presentation:
www-pao.ksc.nasa.gov/kscpao/briefing/